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ABSTRACT

To what extent are predictor variables associated with teaching and learning in graduate school related to graduate students' academic self-efficacy, or their perseverance to achieve course goals? Graduate students (n=145) at a southern university completed a short form of the Student Assessment of Teaching and Learning (original developed by C. Ellett, J. Ruggut, and D. Davis, 1999), reported their absences, and completed the Personal Learning Efficacy Measurement (C. Ellett, J. Ruggut, and D. Davis, 1999). Statistically significant ($p<.05$) relationships ranging from $r=.16$ to $r=.41$ were found between five of the predictor variables and academic self-efficacy. Factor analyzing the intercorrelation matrix indicated that four factors (labeled as knowledge and academic self-efficacy, skills, absences, and involvement) explained 67% of the variance. These findings provide evidence useful for creating an improved short-form instrument that measures predictor variables that are related to academic self-efficacy. (Contains 3 tables and 27 references.) (Author/SLD)

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Measuring Interrelationships Between Graduate Students' Learning Perceptions and Academic Self-Efficacy

Presented at the 2002 Annual Meeting of the Mid-South Educational Research Association

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Abstract

To what extent are predictor variables associated with teaching and learning in graduate school related to graduate students' academic self-efficacy, or their perseverance to achieve course goals? One hundred forty-five graduate students at a southern university completed a short form of the Student Assessment of Teaching and Learning, reported their absences, and completed the Personal Learning Efficacy Measurement. Statistically significant ($p<.05$) relationships ranging from $r=.16$ to $r=.41$ were found between five of the predictor variables and academic self-efficacy. Factor analyzing the inter correlation matrix indicated that four factors (labeled as knowledge and academic self-efficacy, skills, absences, and involvement) explained 67% of the variance. These findings provide evidence useful for creating an improved short-form instrument that measures predictor variables that are related to academic self-efficacy.

It is important for graduate students to develop and durably maintain a positive sense of academic self-efficacy, or confidence that they can persevere to overcome obstacles and accomplish course goals. Noting that graduate students typically have to take introductory courses in research methods and statistics, Onwuegbuzie (2000) reported that research methods and statistics courses threaten the academic self-confidence of the majority of graduate students. Graduate students face the challenge of earning at least a "B" or better average in their research methods and statistics courses while maintaining at least a "B" or better average in their other graduate courses. Many of today's graduate students have enrolled in graduate school many years after their last formal coursework (Onwuegbuzie, 2000), and these graduate students benefit from having academic self-confidence sufficient to encourage their efforts to overcome aversive circumstances and achieve course goals. Bong (1999) differentiated between two types of academic self-confidence by describing academic self-concept as students' academic self-appraisal based on comparison with their peers and by describing academic self-efficacy as students' academic self-appraisal based on their perceived ability to succeed at a given academic task. As the foremost developer of the construct of academic self-efficacy as an important motivation-related variable that is susceptible to being positively modified, Bandura (1977, 1986, 1997) emphasized his contention that people's self-regulatory capabilities enable them to overcome environmental obstacles (such as knowing their achievement is lower than their peers' achievement) and achieve mastery over criterion-referenced course goals. Rejecting the behaviorist notion that environmental stimuli exert the determinant influence on human behavior, Bandura (1977) theorized

that "continuous reciprocal interactions" between environmental stimuli (such as students' perceptions of involvement in coursework and students' perceptions of course emphasis on knowledge and skills that meet their needs), personal factors (such as thought control and self-regulatory capabilities), and behavior (such as grades and absences) exert a three-prong and interrelated influence on students' motivation. Before empirically testing Bandura's theory by measuring interrelationships between the "environmental stimuli" variables of students' learning perceptions and the "personal factor" variable of academic self-efficacy and the "behavior variable" of absences there is a need to examine the historical background and details of his theory.

Bandura's theory that reciprocal interactions between numerous variables influences human motivation and behavior has historical roots in Kurt Lewin's field theory. Lewin's field theory contends that the totality of interacting variables determine human behavior and people interpret and respond to interacting variables according to their perceived needs. Lewin's field theory influenced Henry Murray's development of needs-press theory in which Murray presented needs as the most important factor of the human personality. Needs-press theory holds that people respond positively to environmental stimuli that meet their needs by offering beneficial advantages while people respond negatively to environmental stimuli that run counter to their needs by threatening detrimental disadvantages. As a leading developer of factor analytic approaches to studying the human personality and motivation, Raymond B. Cattell emphasized the importance of identifying interactions between all of the components in the whole field of variables that are related to human behavior and motivation (Madsen, 1974).

Cattell's recommendation that theories be logically consistent, systematically integrated, and capable of having testable hypotheses deduced from them was followed by Albert Bandura as he developed social learning theory and the closely related social cognitive theory. Social learning theory explains human behavior as being influenced by reciprocal interactions between environmental, behavioral, and cognitive determinants (Bandura, 1977). People have cognitive self-regulatory capabilities that enable them to be active agents in their own self-motivation. Reflecting upon their prior academic performance accomplishments, people are capable of developing efficacy expectations that that they can exert sustained effort to overcome environmental obstacles and achieve realistically envisioned goals. The following propositions are deducible from social learning theory. First, college professors promote students' academic self-efficacy by establishing clear course goals that students perceive as meeting their personal and career needs. Second, students presented with clear course goals that meet their needs tend to be motivated to exert their cognitive self-regulatory capabilities in ways that enable them to persistently exert sustained effort in order to accomplish course goals. Students attempting to master course clear course goals that they perceive as meeting their needs tend to be empowered to personally set their own sub goals and sub goal attainment serves to sustain effort and promote motivation. Students perceiving that they are striving to master challenging but doable goals that meet their needs tend to academically self-appraise themselves according to their own capabilities and standards (self-appraisal based on academic self-efficacy) rather than academically self-appraising themselves according to comparisons with their peers (self-appraisal based on academic self-

concept).

In the process of contending that students need both "the skill and the will" to achieve academic success in the classroom, Pajares (1996) suggested the likelihood of increases in students' academic self-efficacy leading to increased use of cognitive strategies that in turn lead to enhanced academic performance.

Guffey and Rampp (1999) found through experimental research that systematic training in metacognitive skills improved the academic self-efficacy of underachieving college students. Metacognition refers to the knowledge that people have about their cognitions or thinking and their ability to control their cognitions or thinking. Underachieving college students were given systematic instruction in: underlining, summarizing, knowledge acquisition, test taking strategies, and problem solving skills which were designed to enhance the students' academic self-efficacy by helping them perceive that they are in control of their academic learning (Guffey & Rampp, 1999). This study indicates that deliberate manipulation of environmental stimuli has the potential to improve college students' academic self-efficacy.

Carnes and Carnes (1991) and Shunk (1996) have found that academic self-efficacy is of pre-eminent importance for sustaining genuine long-term academic achievement. Using path models and structural equation modeling to simultaneously test a variety of cognitive, psychological, and facilitative variables in their study of the freshman academic achievement of 445 freshman college students, Zhang and RiCharde (1999) found that concentration (a measure of metacognitive skills and distractibility) was directly related ($r = .72$) with academic self-efficacy and concentration was indirectly

related (r= .45) to study skills. Surprisingly, these researchers found a negative relationship (r= -.23) between academic self-efficacy and freshman academic achievement which they attributed to the entering freshmen's lack of knowledge about college-level learning and their uninformed predictions of their probabilities for succeeding academically. Another possibility for the negative relationship between academic self-efficacy and academic achievement found in this study was that academic self-efficacy was broadly measured as overall academic self-efficacy instead of being more specifically measured as self-efficacy to achieve task-specific academic goals. Bandura (1997) conceptualized academic self-efficacy as a mediating variable that mediates the relationship between environmental stimuli and behavior such as absences and academic achievement. Therefore environmentally and cognitively enhancing academic self-efficacy may be beneficial even in situations where academic self-efficacy has no direct and positive relationship with academic achievement.

However, experimental research studies and correlation research studies have provided evidence of positive relationships between academic self-efficacy and academic achievement. There is evidence based on experimental research that increases in academic self-efficacy result in corresponding increases in academic achievement. Shunck (1991) and Shunck and Schwartz (1993) have provided empirical evidence that using instructional practices such as modeling, strategy training, goal setting, and progress feedback to students increased task-specific academic self-efficacy and gains in task-specific academic self-efficacy resulted in gains in task-specific academic

achievement. In addition, numerous studies based on correlation research have found positive relationships between academic self-efficacy and academic achievement. After performing a meta-analysis of the research literature on academic self-concept and academic self-efficacy, Skaalvik and Rankin (1998) provided evidence that academic self-efficacy is the stronger predictor of academic achievement. Pajares and Miller (1994) found a relationship of r=.55 between math self-efficacy and math problem solving which was stronger than the relationship between math self-concept and math achievement. Shunck (1984) found a relationship between mathematics self-efficacy and math performance measured at r=.46. Pajares and Johnson (1996) found a relationship of r=.40 between writing self-efficacy and writing achievement; in addition these researchers also found that academic self-efficacy played a mediational role between a variety of predictor variables and academic achievement as theorized by Bandura.

The level of specificity at which academic self-efficacy is measured is an important issue in this type of research. Aware of the fact that academic self-concept research has been criticized for overusing broad and global assessment devices, academic self-efficacy researchers have attempted to assess academic self-efficacy with more task-specific measures that correspond closely to the specific types of academic confidence being measured (Pajares, 1996). Bandura (1986) recommended assessing academic self-efficacy at the "optimal level of specificity" that agrees with the academic task and domain being assessed. Eliett, Rugutt, and Davis (1999) developed the Personalized Learning Efficacy Measurement (PLEM) as an academic self-efficacy measuring

instrument designed for college students, especially upperclassmen and graduate students. The PLEM addresses specificity of assessment issues by asking participants to self-assess their academic self-efficacy in relation to their involvement in the course during which they complete the PLEM. With fullest credit and acknowledgement extended to Doctors Ellett, Rugutt, and Davis as developers of the PLEM, I decided to use the PLEM because it is ideally suited for the assessments involved in this study.

Needs-Opportunity Theory

The theory that there is a positive relationship between graduate students' learning perceptions and academic self-efficacy is based on the following propositions. The general background assumption is that living things seek beneficial advantages and try to avoid or overcome detrimental disadvantages. For example, tree roots seek nutrients and try to bypass or overcome obstacles. Proposition one is that people attend to opportunities that meet their needs by offering beneficial advantages (Murray, 1938). Proposition two (deducible from Bandura's social learning theory) is that graduate students attend to learning opportunities they perceive as meeting their intellectual and career needs. As recommended by Hempel (1966), the bridge principle that connects propositions two and three is that graduate students perceiving that they are trying to accomplish clear course goals that meet their intellectual and career needs tend to be empowered to exert sustained effort toward overcoming obstacles to learning. Proposition three is that graduate students' perceptions of involvement in graduate courses that meet their intellectual and career needs are positively related with their academic perseverance.

The null hypothesis deduced from this theory is that there will be no statistically significant ($p<.05$) relationship between the predictor variables of graduate students' course emphasis perceptions, involvement and affiliation perceptions, and absences, and the dependent variable of academic self-efficacy.

Method

Participants

The participants in this study were 158 graduate students attending a small deep-South university that typically has approximately 2000 students in its undergraduate component and approximately 400 students in its graduate component. Since this university enrolls graduate students in a wide variety of education and social service-related disciplines, the 158 students who supplied data for this study had majors and occupations including elementary education, physical education, specific content areas for secondary education, special education, library media, educational administration and counseling. All participants were graduate students who were enrolled in the College of Education. The sample of 158 graduate students included 90 women and 68 men who were all enrolled in masters degree programs. Approximately sixty-five percent of the participants were African American and thirty-five percent were Caucasion. The participants ranged in age from their early twenties to their early fifties. Three statistics classes, three research methods classes, two educational administration classes, and one controversy in education class were used to collect data for this study.

Research oversight requirements were followed. Permission from the sponsoring

university to collect the data was obtained. Participants were read a statement informing them that their participation was voluntary and their responses would be anonymous.

Instruments and Procedure

I condensed the Student Assessment of Teaching and Learning that was developed by Doctors Ellett, Ruggut, and Davis (1999) into a short-form version of the Student Assessment of Teaching and Learning in order to measure the study's first five variables of involvement, affiliation, knowledge, critical thinking skills, and professional skills. The involvement subscale measured participants' perceptions of the extent to which they understood course goals, paid attention in class, and tried to understand the work in the class. This subscale had a split-half reliability coefficient of r=. 60. The affiliation subscale measured participants' perceptions of the extent to which they cooperated with other students and shared books and resources when doing assigned work. This subscale had a split-half reliability coefficient of r=. 59. The knowledge subscale measured participants' perceptions of the extent to which learning factual information and developing concepts were emphasized in the course. This subscale had a split-half reliability coefficient of r= .31.The critical thinking skills subscale measured participants' perceptions of the extent to which understanding and applying theories, critical analysis and problem solving, and creative thinking were emphasized in the class. This subscale had a split-half reliability coefficient of r= .52. The professional skills subscale measured participants' perceptions of the extent to which developing career, speaking, and writing skills were emphasized in the class. This subscale had a split-half reliability coefficient of r= .75.

Participants responded to the involvement and affiliation items according to a 5-point Likert-type format. Participants responded to the knowledge, critical thinking skills, and professional skills items according to a 4-point Likert-type format.

Doctors Ellett, Rugutt, and Davis (1999) established a reliability coefficient of r=.92 for the PLEM which was used to measure the participants' academic self-efficacy. A split-half reliability coefficient of r=.64 was established on the PLEM based on scores generated by the participants of this study during the Spring of 2002.

Data Analysis

After running descriptive statistics in order to measure the means and standard deviations of scores generated by participants on all seven of this study's variables, an inter correlation matrix was run in order to measure the correlations between scores measured on all of these variables. Then, multiple correlation was used in order to measure the percentage of variance in the dependent variable of academic self-efficacy that was explained by all six of the predictor variables taken collectively. Data collected on all of the study's variables was then subjected to principal components analysis and a scree plot was run. Finally, factor analysis with Varimax rotation was used.

Results

Participants' scores on the variables of involvement and affiliation could range between three and fifteen. The mean for involvement was 13.46 and the standard deviation was 1.81. The mean for affiliation was 8.90 and the standard deviation was 1.60. Participants' scores on the variables of knowledge and critical thinking skills could range between three and twelve. The mean for knowledge was 10.01 and the standard

deviation was 1.67. The mean for critical thinking skills was 9.81 and the standard deviation was 1.90. Participants' scores on the variable of professional skills could range between four and sixteen. The mean for professional skills was 13.07 and the standard deviation was 2.65. Participants' scores on the variable of absences ranged from a minimum of 0 absences to a maximum of 4 absences. The standard deviation for absences was 1.00.

Testing the study's null hypothesis with multiple correlation revealed that the predictor variables of knowledge, critical thinking skills, professional skills, involvement, affiliation and absences explained a statistically significant (p=.00) 24% of the variance in the dependent variable of academic self-efficacy. Therefore, the study's null hypothesis was rejected with a 0% probability of committing Type 1 error.

The correlations between each of the study's predictor variables and the dependent variable as well as the correlations between each of the study's predictor variables are reported in Table 1. The correlations were as follows. The correlation between involvement and academic self-efficacy was r= .41 and the p-value was p= .00. The correlation between affiliation and academic self-efficacy was r= .16 and the p-value was p=.04. The correlation between knowledge and academic self-efficacy was r= .38 and the p-value was p=. 00. The correlation between professional skill and academic self-efficacy was r= .32 and the p-value was p= .00. The correlation between absences and academic self-efficacy was r= -.13 but this correlation was not significant with a p-value of p= .13. All but two of the predictor variables were significantly correlated with one another. Absences was not significantly correlated with any of the predictor

variables and affiliation and knowledge were not significantly correlated. Correlations between the predictor variables ranged from a high of r= .60 between critical thinking skills and professional skills to a low of r= .30 between affiliation and professional skill. The inter correlation matrix is displayed in Table 1.

Subjecting the inter correlation matrix to principal components analysis (displayed in Table 2) and running a scree plot indicated that four factors explained 81% of the variance of the inter correlation matrix. Running factor analysis with Varimax rotation on four factors (displayed in Table 3) indicated that four factors (labeled as knowledge and academic self-efficacy, skills, absences, and involvement) explained 67% of the variance of the inter correlation matrix.

Referring to the authority of Charles Spearman as the leading developer of factor analysis, Aiken (1991) described factor analysis as a procedure for reducing the number of variables in a group of measurements by considering the correlations or overlap between the measures. As used in educational and psychological assessment, factor analysis is employed to detect a few prominent or noticeable factors that account for substantial variance in scores measured on a larger number of variables.

Discussion

This study has used multiple correlation to indicate that the study's six predictor variables explained 24% of the variance (or average squared deviations from the mean) in the dependent variable of academic self-efficacy. This study has also used an inter correlation matrix to measure the extent of linear relationship between all seven of the study's variables. Positive relationships between three predictor variables (knowledge,

critical thinking skills, and professional skills) that measured students' perceptions of course emphasis and the dependent variable of academic self-efficacy provided empirical evidence to substantiate this study's theory that graduate students' perceptions of involvement in graduate courses that offer opportunities to meet their intellectual and career needs are positively related with their academic perseverance.

During the spring semester of 2001, Byer gathered data for a study that was very similar to the study reported in this article. One difference was that graduate students and undergraduates provided data that Byer collected during the spring semester of 2001 while only graduate students provided data for Byer during the spring semester of 2002. Another difference was that Byer used course evaluations as a dependent variable in the study that he collected data for during the spring semester of 2001 while he did not use course evaluations as a dependent variable in the study that he collected data for during the spring of 2002. The only other difference between these two similar studies was that Byer did not use absences as a predictor variable in the study that he collected data for during the spring semester of 2001 while he did use absences as a predictor variable in the study that he collected data for during the spring semester of 2002. Interestingly, Byer found similar correlations between the predictor variables and academic self-efficacy in both studies. After running correlation on the data collected in the spring semester of 2001, Byer (2002) found statistically significant ($p<.05$) positive relationships between the following predictor variables and academic self-efficacy: the correlation between involvement and academic self-efficacy was $r= .55$, the correlation between knowledge

and academic self-efficacy was r= .35, the correlation between critical thinking skills and academic self-efficacy was r= .37, and the correlation between professional skills and academic self-efficacy was r= .36. Comparatively, Byer found similar correlations between the same predictor variables and the same dependent variable that were again measured using the same instrumentation during the spring semester of 2002. Using data collected during the spring semester of 2002, Byer found a correlation of r= 41 between involvement and academic self-efficacy and he also found a correlation of r= 38 between knowledge and academic self-efficacy. In addition, he found a correlation of r= .36 between critical thinking skills and academic self-efficacy and he also found a correlation of r= .32 between professional skills and academic self-efficacy.

After finding consistent and similar correlation between students' perceptions of classroom involvement and academic self-concept in four separate studies, Byer (2001) theorized that evidence of consistent relationships between variables provides justification for developing a general theory based on findings of consistent relationships. Although limited by its inability to provide evidence for causation, correlation research is logistically feasible, convenient, and easily replicable (Aron & Aron, 1999). Therefore, correlation research is ideally suited for finding regularities such as consistently similar relationships between the same variables that have been found in different studies using different participants. Woolf (1979) defined science as knowledge covering general truths or the operation of general laws, especially as obtained and tested through the scientific method. Comparisons of numerous correlation studies that found regularities by using the same instrumentation to measure the scores generated by different participants at

different locations facilitates the process of theory development and the process of developing general laws. Consistent relationships found between graduate students' learning perceptions and academic self-efficacy adds to the knowledge base that is usable for making continuing improvements on Bandura's social cognitive theory. After contending that the goal of science is to promote the growth of knowledge, Popper (1979) recommended extensive testing and retesting of hypotheses as a means of discarding falsified hypotheses and as a means of corroborating hypotheses that have survived the rigors of empirical testing.

Limitations of this study included not having randomly selected participants and using a sample disproportionately comprised be women. Other limitations were that only correlation data was used and a limited number of variables were examined. Future research into the sources of graduate students' academic self-efficacy should investigate a larger number of variables including academic achievement and this research should also employ experimental methods that supply evidence of causation. Academic self-efficacy research presently being undertaken includes the same seven variables that were used in this study in addition to seven additional variables. Participants take a statistics pretest on the first day of class and they take a statistics posttest during the last class meeting before the final examination. Participants complete a self-evaluation of statistics knowledge on the first class meeting and they complete the same instrument during the last class meeting before the final examination. Participants' scores on their instrument or test development project is a variable in addition to their midterm and final exam scores. This type of research is research-based assessment that is time-efficient and logistically

feasible because it is synchronized with the teaching and learning process and it takes very little extra classroom time. Pointing to contradictions made by over relying on high stakes standardized tests that are used to make assessments of learning, Stiggins (2002) emphasized the benefits of making assessments for learning by assessing students' self-evaluations and learning perceptions during the process of teaching and learning.

Therefore, future research into the academic self-efficacy of college students and in particular graduate students should develop a more complete and comprehensive model that includes both endogenous and exogenous variables that are likely to be directly or indirectly related with academic self-efficacy. When feasible, including academic achievement as a variable in academic self-efficacy research is very beneficial. Since many predictor variables correlate with academic self-efficacy and since no predictor variable is a perfect measurement of academic self-efficacy, factor analysis is useful for reducing a larger number of predictor variables into a smaller number or underlying factors that serve as more accurate predictor variables. Based on the results of factor analysis, better short-form instruments need to be created to measure predictors of academic self-efficacy. Factor analysis used in this study has provided evidence that knowledge, skills, involvement, and absences are underlying dimensions that predict academic self-efficacy.

Much credit is extended to Albert Bandura as the leading developer of academic self-efficacy literature and much credit is also extended to Doctors Ellett, Rugutt, and Davis as developers of high-quality instruments for measuring academic self-efficacy and related predictor variables. Graduate students stand to tangibly gain from this research.

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Table 1. Pearson Product-Moment **Correlations** of Predictor Variables and Academic Self-Efficacy

Legend for Chart:

inv..... involvement
aff.....affiliation
know.....knowledge
cts.....critical thinking skills
profskil.....professional skills
absences.....absences
ase.....academic self-efficacy

	inv	aff	know	cts	profskil	absences
aff	.32*					
know	.46*	.04				
cts	.50*	.26*	.55*			
profskil	.53*	.30*	.44*	.60*		
absences	.05	.09	.02	.07	.07	
ase	.41*	.17*	.38*	.36*	.32*	-.13

* statistically significant ($p<.05$) interrelationship

Table 2. – Principal components analysis of the inter correlation matrix (variables included are: involvement, affiliation, knowledge, critical thinking skills, professional skills, absences, and academic self-efficacy)

Eigenanalysis of the inter correlation matrix
(145 cases used; 14 cases contain missing values)

Eigenvalue	2.96	1.14	0.93	0.67	0.50	0.47	0.35
Proportion	0.42	0.16	0.13	0.10	0.07	0.07	0.05
Cumulative	0.42	0.58	0.72	0.81	0.88	0.95	1.0

Variable	PC1	PC2	PC3	PC4	PC5	PC6	PC7
inv	0.46	0.07	-0.09	0.07	0.77	0.36	-0.26
affiliation	0.24	0.44	-0.75	-0.07	-0.00	-0.41	0.11
know	0.42	-0.22	0.41	-0.01	0.23	-0.65	0.38
cts	0.48	0.05	0.16	0.21	-0.44	-0.17	-0.69
profskil	0.46	0.14	0.02	0.39	-0.33	0.46	0.55
absences	0.04	0.76	0.46	-0.44	0.03	0.08	0.01
ase	0.35	-0.39	-0.15	-0.79	-0.24	0.21	0.04

abbreviations for variable labels:

inv.....involvement
aff.....affiliation
know.....knowledge
cts.....critical thinking skills
profskil.....professional skills
absences.....absences
ase.....academic self-efficacy

Table 3. Maximum likelihood factor analysis of the inter correlation matrix (includes the variables of: involvement, affiliation, knowledge, critical thinking skills, professional skills, absences, and academic self-efficacy)

Unrotated factor loadings and communalities

Variable	Factor 1	Factor 2	Factor 3	Factor 4	Communality
Inv	0.461	0.878	0.105	-0.007	0.995
Aff	0.058	0.333	-0.083	0.270	0.194
Know	0.966	0.000	0.260	0.000	1.000
CTS	0.547	0.287	0.061	0.524	0.660
Profskil	0.440	0.379	0.037	0.497	0.586
Absences	0.276	-0.000	-0.961	-0.000	1.000
ASE	0.340	0.235	0.229	0.156	0.248
Variance	1.83	1.16	1.07	0.62	4.68
% Variance	0.26	0.17	0.15	0.09	0.67
Cumulative	26%	43%	58%	67%	

Rotated Factor Loadings and Communalities (Varimax Rotation)

	Factor 1 Knowledge	Factor 2 Skills	Factor 3 Absences	Factor 4 Involvement	Communality
Inv	0.292	0.413	0.003	0.860	0.995
Aff	-0.049	0.390	-0.061	0.189	0.194
Know	0.979	0.136	-0.022	0.152	1.00
CTS	0.443	0.669	-0.042	0.118	0.660
Profskil	0.320	0.667	-0.034	0.195	0.586
Absences	-0.017	0.087	-0.996	-0.001	1.000
ASE	0.329	0.276	0.146	0.204	0.248
% variance	0.262	0.166	0.152	0.088	0.669

Factor Score Coefficients:	Factor 1	Factor 2	Factor 3	Factor 4
Inv	-0.191	0.024	0.004	1.206
Aff	-0.008	0.120	0.011	-0.053
Know	1.104	-0.394	-0.053	-0.183
CTS	-0.037	0.551	0.049	-0.251
Profskil	-0.029	0.429	0.038	-0.194
Absences	-0.024	-0.003	-1.003	0.011
ASE	-0.005	0.074	0.007	-0.032

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